

## **REMARKS**

In view of the above amendments and the following remarks, reconsideration of the rejections contained in the Office Action of August 5, 2010 is respectfully requested.

By this Amendment, claims 1-3 and 8-10 have been cancelled, and new claims 15-20 have been added and are currently pending in the application. No new matter has been added by these amendments.

The entire specification and abstract have been reviewed and revised. Due to the number of revisions, the amendments to the specification and abstract have been incorporated into the attached substitute specification and abstract. For the Examiner's benefit, a marked-up copy of the specification and abstract indicating the changes made thereto is also enclosed. No new matter has been added by the revisions. Entry of the substitute specification is thus respectfully requested.

On page 2 of the Office Action, the Examiner rejected claims 1-3 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In particular, the Examiner indicates that claims 1-3 are directed toward intangible subject matter, mental steps or abstract ideas. As indicated above, it is noted that claims 1-3 and 8-10 have been cancelled and replaced with new claims 15-20, and the new claims have been drafted so as to fully comply with 35 U.S.C. § 101. Accordingly, it is respectfully submitted that the Examiner's rejection under 35 U.S.C. § 101 is not applicable to the new claims.

On pages 2-3 of the Office Action, the Examiner rejected claims 1-3 and 8-10 under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the Examiner asserted that it is unclear what is meant by a first or second "threshold." As indicated above, claims 1-3 and 8-10 have been cancelled and replaced with new claims 15-20, and the new claims have been drafted so as to fully comply with all the requirements of 35 U.S.C. § 112. In particular, it is noted that the new claims recite a "positive threshold value" and a "negative threshold value" (instead of a first or second threshold). Therefore, it is respectfully submitted that the Examiner's formal rejections under § 112 are not applicable to the new claims.

On pages 3-4 of the Office Action, the Examiner rejected claims 1-3 and 8-10 under 35 U.S.C. § 102(b) as being anticipated by Stava (US 6,025,573). However, as indicated above, claims 1-3 and 8-10 have been cancelled and replaced with new claims 15-20. For the reasons discussed below, it is respectfully submitted that the new claims are clearly patentable over the

prior art of record.

Independent claim 15 recites a control method for an arc welding apparatus comprising a voltage detector, a voltage change amount detection part, a neck determination part and a neck prohibiting detection part. The method of claim 15 includes detecting a welding voltage using the voltage detector, calculating  $dv/dt$  using the voltage change amount detection part, and determining whether a neck of a droplet is formed by comparing the calculated  $dv/dt$  with a positive threshold value using the neck determination part.

Further, the method of claim 15 includes comparing the calculated  $dv/dt$  with a negative threshold value using the neck prohibiting detection part, and *sending a first neck detection prohibiting signal from the neck detection prohibiting part to the neck determination part in response to a determination by the neck prohibiting detection part that the calculated  $dv/dt$  is less than the negative threshold value, wherein the first neck detection prohibiting signal prohibits the determining of whether a neck is formed for a first predetermined period of time beginning at the determination of the calculated  $dv/dt$  being less than the negative threshold value.*

Stava discloses a controller and method for pulse welding in which a welding process is controlled based on a detect signal DS, which corresponds to the separation of a droplet from the consumable electrode. In particular, as shown in Fig. 2A, Stava discloses that as a droplet begins to form, the derivative of the arc voltage (*i.e.*,  $dv/dt$ ) is a negative value, and that when the droplet separates, the derivative immediately shifts to a positive value. Further, Stava discloses that the shift from the negative value of the derivative to a positive value occurs at point DP (shown in Fig. 2A), and that the detect signal DS is created upon detection of the point DP.

However, Stava does not disclose a method which includes *sending a first neck detection prohibiting signal from the neck detection prohibiting part to the neck determination part in response to a determination by the neck prohibiting detection part that the calculated  $dv/dt$  is less than the negative threshold value, wherein the first neck detection prohibiting signal prohibits the determining of whether a neck is formed for a first predetermined period of time beginning at the determination of the calculated  $dv/dt$  being less than the negative threshold value*, as required by independent claim 15.

Rather, in column 7, line 46 through column 8, line 34, Stava discloses that when the negative value threshold detector 140 determines that  $dv/dt$  has a negative value that exceeds a

set reference value, a shift detector 150 waits for a signal from the positive value threshold detector 130 indicating that the value of  $dv/dt$  has shifted to a positive value (at the point DP) so that the detected signal DS can be produced.

Thus, Stava discloses that upon determining that  $dv/dt$  has a negative value that exceeds a set reference value, the shift detector is actively seeking the point DP at which the value of  $dv/dt$  shifts to a positive value which exceeds a set reference value, and therefore Stava does not disclose a method which includes (1) determining whether a neck of a droplet is formed by comparing the calculated  $dv/dt$  with a positive threshold value, and (2) sending a first neck detection prohibiting signal from the neck detection prohibiting part to the neck determination part in response to a determination by the neck prohibiting detection part that the calculated  $dv/dt$  is less than the negative threshold value, wherein the first neck detection prohibiting signal prohibits the determining of whether a neck is formed for a first predetermined period of time beginning at the determination of the calculated  $dv/dt$  being less than the negative threshold value, as required by independent claim 15, and therefore it is respectfully submitted that Stava does not anticipate independent claim 15.

Independent claim 18 recites an arc welding apparatus comprising a voltage detector for detecting a welding voltage, a voltage change amount detection part for calculating  $dv/dt$ , and a neck determination part for determining whether a neck of a droplet is formed by comparing the calculated  $dv/dt$  with a positive threshold value.

Further, the arc welding apparatus of claim 18 includes a neck prohibiting detection part for comparing the calculated  $dv/dt$  with a negative threshold value, *wherein said neck prohibiting detection part outputs a first neck detection prohibiting signal to said neck determination part in response to a determination that the calculated  $dv/dt$  is less than the negative threshold value, wherein the first neck detection prohibiting signal prohibits said neck determination part from determining whether a neck is formed for a first predetermined period of time* beginning at the determination of the calculated  $dv/dt$  being less than the negative threshold value.

As is similarly discussed above, Stava discloses that upon determining that  $dv/dt$  has a negative value that exceeds a set reference value, the shift detector is actively seeking the point DP at which the value of  $dv/dt$  shifts to a positive value which exceeds a set reference value, and therefore Stava does not disclose an arc welding apparatus which includes (1) a neck determination part for determining whether a neck of a droplet is formed by comparing the

calculated  $dv/dt$  with a positive threshold value, and (2) a neck prohibiting detection part for comparing the calculated  $dv/dt$  with a negative threshold value, wherein said neck prohibiting detection part outputs a first neck detection prohibiting signal to said neck determination part in response to a determination that the calculated  $dv/dt$  is less than the negative threshold value, wherein the first neck detection prohibiting signal prohibits said neck determination part from determining whether a neck is formed for a first predetermined period of time, as required by independent claim 18. Accordingly, it is respectfully submitted that Stava does not anticipate independent claim 18.

Therefore, it is respectfully submitted that independent claims 15 and 18, as well as claims 16, 17, 19 and 20 which depend therefrom, are clearly allowable over the prior art of record.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice to that effect is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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